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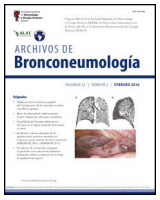

Editorial

The Eponymous Dr. Richard W. Light: Father of Pleural Medicine

El epónimo Dr. Richard W. Light: Padre de la Medicina Pleural

Richard W. Light (1942–2021) was a world-renowned pulmonologist, best known for his research on pleural diseases and, in particular, for the development of criteria to separate pleural transudates from exudates, otherwise named "Light's criteria".[1] His great volume of work resulted in many outstanding contributions to Pleural Medicine and other aspects of Respiratory Medicine, but he will no doubt be best remembered for his famed criteria. As a memorial tribute, this article highlights some long-lasting personal achievements of Dr Light, most of which bear his name.

The first and most significant milestone refers to the creation of Light's criteria. At the beginning of 1970, when he was a pulmonary fellow at Johns Hopkins Hospital under the mentoring of Dr. Wilmot C. Ball Jr, he became interested in measuring several biochemical parameters on pleural fluids (e.g., pH, lactate dehydrogenase (LDH) isoenzymes, glucose, amylase, pCO_2) to aid in the differential diagnosis of pleural effusions. After recruiting 150 patients over a 2-year period, he empirically set the following best dividing points for the three parameters which, in combination, allowed an accurate identification of exudates: pleural fluid to serum protein ratio > 0.5, pleural fluid to serum LDH ratio > 0.6 and pleural fluid LDH > 2/3 (67%) the upper normal limit for serum LDH. An exudate met at least one of these three criteria while a transudate met none. He submitted an abstract of these preliminary findings to the American Thoracic Society meeting in 1971, but it was rejected. In April 1972 he sent an original manuscript to Annals of Internal Medicine, where it was accepted with minor changes.[2] So, the criteria which earned Dr Light the most recognition were initially turned down in a Pulmonology congress! To date, his landmark paper has received more than 1100 citations.

Determining the difference between transudates and exudates is a pragmatic first step when evaluating a pleural effusion because it simplifies diagnostic efforts in establishing the cause of fluid accumulation. In the selected population of the Light et al. study, the reported new criteria yielded 99% sensitivity and 98% specificity for exudate identification.[2] In subsequent studies, it became apparent that Light's criteria were actually highly sensitive (98%) but moderately specific in that 25–30% of transudates were falsely classified as exudates, usually by a small margin.[3] Despite this limitation, Light's criteria have stood the test of time because they are simple, easy to remember, readily available and accurate.[4] None of the many other proposed laboratory tests to differentiate transudates from exudates have been shown to be superior to Light's criteria, which are expected to remain as the gold standard for years to come. The moderate specificity of Light's criteria can be overcome by the measurement of the serum to pleural fluid protein gradient, the albumin gradient, the pleural concentrations of the natriuretic peptide NT-proBNP or a combination thereof.[5]

In the 1980s, Dr Light first promoted the clinical use of pleural manometry in the management of pleural effusions. Using a U-shape water manometer, Light et al. monitored pleural pressures during thoracentesis in 52 patients and demonstrated that large volumes of pleural fluid (>1 L) can be safely removed, provided pleural pressure remains above −20 cm H_2O.[6] Since then, a number of clinical studies have examined different expanded applications of pleural manometry, though data are still too scarce to support its routine use in clinical practice. The definitive diagnosis of unexpansible lung is, however, an accepted indication for measuring pressures in the pleural space.

Dr. Light also devised and reported a method for estimating the size of a pneumothorax on a postero-anterior chest radiograph, commonly referred to as "Light index". That method is based on the assertion that the volume of the lung and the hemithorax are roughly proportional to the cube of their diameters.[7,8] The percentage size of the pneumothorax is calculated by the formula: $(1 - L^3/H^3) \times 100$, where L is the diameter of the collapsed lung, and H is the diameter of the ipsilateral hemithorax, both at the hilar level. This calculation is not possible if pleural adhesions are present. The Light index was shown to be closely related to the actual volume of manually aspirated air from the pleural cavity.[9] Currently, Light index is one of the three methods for estimating the size of a pneumothorax, the other two being the interpleural distance at the hilum, and the apex-cupola distance.

Dr. Light established a useful classification to assist physicians in the initial care of patients with parapneumonic effusions. These effusions were divided into seven classes with a treatment recommendation for each one: class 1 – non-significant pleural effusion; class 2 – typical parapneumonic effusion; class 3 – borderline complicated pleural effusion; class 4 – simple complicated pleural effusion; class 5 – complex complicated pleural effusion; class 6 – simple empyema; and class 7 – complex empyema.[10] A second classification developed by the American College of Chest Physicians in 2000, of which Dr. Light was a panel expert member, also gained in popularity.[11] In essence, Light's counseling on the indications for chest tube drainage in the context of parapneumonic effusions still applies today, namely, the presence of pus, Gram stain (or culture) of pleural fluid positive, pleural fluid glucose below 40 mg/dL, pleural fluid pH less than 7.00, or pleural fluid LDH more than three times the upper normal limit for serum.[12]

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Notably, the size of effusions on chest radiographs are commonly graded, both in daily practice and research studies, according to a semiquantitative rule described by Dr Light in 1999, as follows[13]: 0 (no effusion), 1 (blunting of the costophrenic angle), 2 (less than 25% of the hemithorax, but more than blunting), 3 (between 25% and 50% of the hemithorax), 4 (50–75% of the hemithorax), and 5 (>75% of the hemithorax). So concise and pragmatic.

Finally, Dr. Light promoted and participated in the first multicenter randomized study that documented the safety and efficacy of the PleurX catheter to treat malignant pleural effusions, as compared with doxycycline pleurodesis.[14] After this pioneering study, many others have supported the use of indwelling pleural catheters to the point of considering them as a first-line intervention for managing recurrent symptomatic effusions, mainly of a malignant nature.

Very few physicians know that Dr Light conducted a productive research in areas other than pleural diseases as well. For instance, he published about 40 original papers on chronic obstructive pulmonary disease in top respiratory journals. In fact, his most cited article (>1200 citations) as a co-author relates to the implementation of wake up and breathe strategies in mechanically ventilated patients.[15]

"Light's criteria" for transudate-exudate differentiation, "Light's index" for estimating the size of spontaneous pneumothorax, "Light's classification" of parapneumonic effusions, and "Light's semiquantitation" of the radiological size of pleural effusions are some eponyms with which the scientific community have recognized the accomplishments of this giant of chest medicine. Richard Light never retired from clinical research. He was an extraordinary teacher and mentor and, above all, an exceptional person due to his generosity and empathy. Dr. Light's legacy is so meaningful and predictably enduring that he deserves to be called the Father of Pleural Medicine.

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Conflict of interest

None.

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